

REMARKS/ARGUMENTS

Before this Amendment, claims 1-17 were present for examination. Claim 13 has been amended. Claims 1, 2, 8, 10, 12, 14 and 16 have been canceled. No claims have been added. Therefore, claims 3-7, 9, 11, 13, 15 and 17 remain present for examination.

The Office Action has rejected claims 1, 13 and 17 under 35 U.S.C. §102(b) as being anticipated by the cited portions of U.S. Patent No. 6,389,844 to Klein Nagel Voort (“Voort”).

The Office Action rejected claims 3-7 and 9 under 35 U.S.C. §103(a) as being unpatentable over obvious modifications of Voort.

The Office Action rejected claims 11 and 15 under 35 U.S.C. §103(a) as being unpatentable over obvious modifications of Voort, and further in view of the cited portions of U.S. Patent No. 6,308,531 to Roberts et al. (“Roberts”).

Amendments

Claims 1, 2, 8, 10, 12, 14 and 16 have been canceled.

Claim 13 has been amended to more particularly recite the Applicant’s invention. Support for this amendment may be found throughout the application, and particularly at Fig. 2 and p. 12, line 26 - p. 13, line 2.

Applicant respectfully submits that no new matter is believed to be added by this amendment.

Remarks

Claim 3

Claims 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over obvious modifications of Voort.

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.” MPEP 2143.

The Office Action has not provided: (1) prior art references which teach or suggest all of the recitations of claim 3; nor (2) a suggestion or motivation, either in the references or in the general knowledge of the art to combine such references even if they had been provided. Therefore, a *prima facie* case of obviousness has not been established, and the Applicant respectfully traverses the rejection of claim 3.

Claim 3 recites, in part,

“at least two additional circuits for removing heat from the main refrigerants in each of the main refrigerant circuits, where the additional circuits are separate from the pre-cooling refrigerant circuit such that said additional circuits do not exchange heat with the pre-cooling refrigerant circuit;

and wherein said main refrigerant circuits are separate from the pre-cooling refrigerant circuit such that said main refrigerant circuits do not exchange heat with the pre-cooling refrigerant circuit.” (emphasis added)

The Office Action correctly states that Voort does not explicitly teach the above recitations. Office Action, p.7. Instead, the Office Action states that one of ordinary skill in the art, at the time the invention was made, would recognize the advantages of the above limitations, and so modified the system of Voort. *See* Office Action, p. 7-8.

As discussed above, to establish a prima facie case of obviousness, the prior art must teach or suggest all of the limitations of claim 3, and the prior art must provide a suggestion or motivation to combine such limitations to arrive at claim 3.

Nowhere in Voort, or any of the other relied on references, is there a teaching or suggestion of energetically separate pre-cooling/additional circuits and energetically separate main refrigerant/pre-cooling circuits. In Fig 1. of Voort, the pre-cooling circuit 3 exchanges heat with both additional circuits 43, 43' just prior to compressor 31, and the main refrigerant circuits 9, 9' exchange heat with the pre-cooling circuit 3 via additional circuits 43, 43' at heat exchangers 58, 58'. In Fig 2 of Voort, the main refrigerant circuits 57, 57' exchange heat with the pre-cooling circuit 143 at heat exchanger 102. In Fig. 3 of Voort, the main refrigerant circuits 57, 57' exchange heat with the pre-cooling circuits 143, 143' at heat exchangers 102, 102'.

Roberts also does not teach or suggest energetically separate pre-cooling/additional circuits and energetically separate main refrigerant/pre-cooling circuits. In Fig. 1, the pre-cooling circuit and the main refrigerant circuit exchange heat at heat exchanger 150. In Fig. 2, the pre-cooling circuit and the main refrigerant circuit exchange heat at heat exchangers 206 and 222. Fig. 3 only a main refrigerant circuit is used for both pro-cooling and main cooling, with no additional circuits for cooling the main refrigerant circuit is shown. In Fig. 4, the pre-cooling circuit and the main refrigerant circuit exchange heat at heat exchanger 150. In Fig. 5, the pre-cooling circuit and the main refrigerant circuit exchange heat at heat exchanger 150. In Fig. 6, the pre-cooling circuit and the main refrigerant circuit exchange heat at heat exchangers 600 and 601. In Fig. 7, the pre-cooling circuit and an additional circuit exchange heat at the unlabeled heat exchanger beneath valve 703. In Fig. 8, pre-cooling circuits and the main refrigerant circuit exchange heat at heat exchanger 150.

Newly cited U.S. Patent No. 6,742,357 also to Roberts ("Roberts '357") also does not teach or suggest energetically separate pre-cooling/additional circuits and energetically separate main refrigerant/pre-cooling circuits. In Figs. 1-4, no additional circuits for cooling the main refrigerant circuit are shown. The Office Action appears to assert that

intercoolers/aftercoolers 320, 327 in Fig. 2, as well as other coolers shown in Roberts '357 teach additional circuits, however, nowhere is the use of an additional circuit even remotely discussed. Furthermore, even if such an additional circuit did exist, Roberts '357 does not explicitly or implicitly teach that they not exchange heat with any of the pre-cooling circuits disclosed therein. Finally, in Fig. 5, the main refrigerant circuit exchanges heat with the pre-cooling circuits at heat exchanger 353.

So while *none of the embodiments* in references cited in the Office Action show energetically separate pre-cooling/additional circuits and energetically separate main refrigerant/pre-cooling circuits, the Office Action appears asserts that such system are known to those skilled in the art. Therefore, it appears to the Applicant that the Office Action is taking official notice of the existence of such systems. Applicant respectfully traverses this official notice and hereby requests documentary evidence of this proposition as set forth in MPEP 2144.03.

Furthermore, even if energetically separate pre-cooling/additional circuits and energetically separate main refrigerant/pre-cooling circuits where taught or suggested by some prior art reference, no motivation or suggestion has been shown which would lead one skilled in the art to combine these references with the other relied on references. Overwhelmingly, the cited references show energetically *combined* pre-cooling/additional circuits and main refrigerant/pre-cooling circuits, so if anything, the cited references teach away from making the invention found in claim 3 which uses *separate* pre-cooling/additional circuits and main refrigerant/pre-cooling circuits.

Indeed, Voort states explicitly that "the pre-cooling refrigerant circuit does not only pre-cool the natural gas, it also serves to pre-cool the refrigerant in the main refrigerant circuits. To this end, the pre-cooling circuit comprises additional circuits." Col. 3, lines 18-22 (reference numerals omitted). Therefore, one of the explicit purposes of the pre-cooling circuit *is* to exchange heat with the main refrigerant circuit. Such a teaching would motivate a person skilled in the art *not* to separate the circuits, and therefore teach away from making the combination found in claim 3.

Because the Office Action has not provided: (1) prior art references which teach or suggest all of the recitations of claim 3; nor (2) a suggestion or motivation, either in the references or in the general knowledge of the art to combine such references even if they had been provided, a *prima facie* case of obviousness has not been established. Applicant therefore believes claim 3 to be allowable and respectfully requests withdrawal of the §103 rejection.

Claims 4-7, 9 and 11

Claims 4-7, 9 and 11 each depend, either directly or indirectly, from claim 3, and are therefore believed to be allowable at least by virtue of their dependence from an allowable base claim. Withdrawal of the rejection of these claims is therefore respectfully requested.

Claim 13

Claims 13 stands rejected under 35 U.S.C. §102(b) as being anticipated by Voort.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” MPEP 2143.

The Office Action has not provided a single prior art reference which teaches all of the recitations of claim 13. Therefore, claim 13 is not anticipated, and the Applicant respectfully traverses the rejection of claim 13.

Amended claim 13 recites, in part,

- (v) removing heat from the natural gas in the pre-cooling heat exchanger using a pre-cooling refrigerant circuit;
- and further comprising
- (vi) removing heat from the main refrigerants in each of the main refrigerant circuits, using at least two additional circuits where the step of removing heat from the main refrigerants is separate from the step of removing heat from the natural gas in step (v) *such that said additional circuits do not exchange heat with the pre cooling refrigerant circuit;*

and wherein the step of removing heat from the natural gas in step (v) *does not make use of said main refrigerant circuits to exchange heat with the pre-cooling refrigerant circuit.*"
(emphasis added)

The italicized recitations of claim 13 are similar to those discussed above in regard to claim 3. As partially acknowledged by the Office Action in relation to claim 3 (*see* Office Action, p. 7), and as described above, Voort does not teach or suggest the italicized recitations.

Because the Office Action has not provided a single prior art reference which teaches all of the recitations of claim 13, the claim is not anticipated. Applicant therefore believes claim 13 to be allowable and respectfully requests withdrawal of the §102 rejection.

Claim 15

Claim 15 depends, either directly or indirectly, from claim 13, and is therefore believed to be allowable at least by virtue of its dependence from an allowable base claim. Withdrawal of the rejection of this claim is therefore respectfully requested.

Claim 17

Claim 17 recites the process of claim 13 carried out in the plant of claim 3. Because either one or both of claims 3 and 13 are believed to be allowable, claim 17 is also believed to be allowable. Withdrawal of the rejection of this claim is therefore respectfully requested.

CONCLUSION

For at least the foregoing reasons, Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

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PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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